

Linking Homelessness in Secondary School to Postsecondary and Early Labor Market Outcomes  
in Maryland Using a Continuum of Risk Framework

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### **Abstract**

Homeless and low-income students share multiple overlapping risk experiences; however, some studies report little to no observed differences in outcomes between these students (Buckner, 2008). From the cumulative risk perspective, homelessness is perched at the extreme edge of economic insecurity, suggesting that homeless students would encounter additional hardship beyond what may be incurred by the experience of poverty alone (Brumley et al., 2015). Using a continuum of risk framework (Masten et al., 1993), this study leveraged statewide administrative data from a 6th grade cohort of Maryland public school students (N= 52,610) to investigate the association between homelessness and educational and early labor market outcomes, above and beyond the associations linked to poverty. Findings provide support for the continuum of risk in relation to educational outcomes; however, no significant differences were observed in early labor market outcomes, although racial differences were detected. This study underscores the importance of targeted interventions in promoting positive, long-term outcomes, particularly for students who were homeless in adolescence.

**Keywords:** disadvantage; homelessness; McKinney-Vento; college enrollment; labor market outcomes

## **Introduction**

More than 1.5 million U.S. public school students were identified by their schools as having experienced homelessness at some point between the 2015-16 and 2017-18 school years, surpassing previously recorded numbers (National Center for Homeless Education [NCHE], 2020). Research examining homelessness in school-age students over a three-year period revealed that adolescents (11th and 12th graders) experience the greatest increases in rates of homelessness (more than 20%), making them a vulnerable population (National Center for Homeless Education [NCHE], 2020). During the 2016-17 school year, roughly 87% of homeless adolescents, ages 13 to 17, resided in federally funded shelters as unaccompanied youth (without a parent/guardian; Child Trends, 2019). Homelessness has multiple undesirable associations with later student achievement, health, and safety (Buckner, 2008; Deck, 2017; Fantuzzo et al., 2012). However, many of the early risks faced by homeless students are also faced by low-income students who are stably housed (see Brumley et al., 2015).

The continuum of risk framework (Masten et al., 1993; Masten et al., 2015) provides a lens in which we can imagine a single continuum—with homelessness perched at the extreme edge of economic insecurity—suggesting that homeless students would encounter additional hardship, beyond what may be incurred by the experience of poverty alone (Brumley et al., 2015). Compared to advantaged and low-income, stably housed youth, homeless youth are more likely to experience worse physical, mental, and behavioral health outcomes (Buckner, 2008; Manfra, 2019; Obradovic et al., 2009). Additionally, prior research shows that homeless youth experience worse academic outcomes than advantaged and low-income, stably housed youth (Buckner, 2008; Manfra, 2019). For example, during the 2018-19 school year, homeless students performed worse on statewide assessments than their low-income, stably housed peers, in which

30% of homeless students were proficient in reading/language arts, 25% achieved proficiency in mathematics, and 28% were proficient in science (National Center for Homeless Education, 2021). Furthermore, a two-year analysis of district-level administrative data using the expanded federal definition of homelessness (inclusive of doubled-up students) revealed that homeless students were more likely than low-income students to have lower grade point averages (GPAs), higher rates of absenteeism, and experience lower rates of on-time graduation over a two-year time period (Low et al., 2017).

Adolescence is a critical developmental period spanning between childhood and adulthood (age 10 through late teens) that is characterized by rapid physical, cognitive, and socioemotional changes associated with puberty (Lerner & Steinberg, 2009). During this time, adolescents are focused on establishing increased autonomy and peer acceptance (Lerner & Steinberg, 2009), which often triggers parental conflict and runaway episodes, key contributors of homelessness among youth (Edidin et al., 2012; Toro et al., 2007). Adolescence is also marked by other normative challenges, such as identity formation, dating, increased risky behaviors (e.g., substance use, unprotected sex), and peer influence (Lerner & Steinberg, 2009; Mushonga & Henneberger, 2019). However, recent literature shows that identifying as a sexual minority, experiencing sexual/dating violence, and engaging in risky behaviors are linked to adolescent homelessness (Cutuli et al., 2020; Toro et al., 2007). For disadvantaged adolescents, the normative challenges associated with adolescence are compounded by poverty-related stressors, including inadequate housing, substandard schools, and financial difficulties (Hardaway & McLoyd, 2009; Wagmiller & Adelman, 2009). Indeed, poverty has been shown to play a profound role in predicting student academic performance, and academic achievement gaps between students with high socioeconomic and low socioeconomic backgrounds grow

when adolescents shift from elementary and middle school into high school (Caro et al., 2009; Reardon, 2016). Although adolescents are most at risk for experiencing homelessness (Cutuli et al., 2020; Toro et al., 2007), prior research largely focuses on the primary and secondary academic trajectories of homeless youth (Cutuli et al., 2013; Metzger et al., 2015). Consequently, relatively little is known about the postsecondary and early labor market outcomes for this population. Therefore, the goal of the present study was to examine the associations between homelessness in secondary school and long-term educational and early labor market outcomes using statewide administrative data from Maryland.

### **Homelessness, Poverty, and the Continuum of Risk Framework**

The continuum of risk framework, originally proposed by Masten and colleagues (1993), postulates that increased exposure to adverse risk factors is associated with poorer outcomes, particularly for homeless children. From this perspective, homelessness can be viewed as falling at the extreme end of the continuum, with additional risk experiences above and beyond those associated with poverty. Three types of risks are important to consider on the continuum (Buckner, 2008; Masten et al., 2014; Pavlakis et al., 2017). First, there are common risks that all students experience, such as biological and family-related stressors (e.g., developmental challenges and major life events; Buckner, 2008; Pavlakis et al., 2017; Rog et al., 2007). Second, there are poverty-related risks that are specific to students experiencing poverty, which may include having unemployed parents, single-parent households, low levels of parental education, economic insecurity, exposure to community violence, and limited resources (Buckner, 2008; Manfra, 2019; Masten et al., 2015; Miller, 2011). Third, there are homelessness-related risks that are specific to experiences with being homeless, such as stigma, housing instability, school mobility, absenteeism, physical and mental illnesses, substance abuse, and issues that arise with

living in shelter environments that present additional challenges for these students (Buckner, 2008; Masten et al., 2015; Miller, 2011). Homeless students experience all three different types of risks (Buckner, 2008), compounding the risks homeless students face when compared to students experiencing poverty, who are more at risk than students experiencing neither homelessness nor poverty. Maslow's hierarchy of needs would suggest that homeless students may be preoccupied with their immediate survival and safety needs (Maslow, 1943). Brumley and colleagues (2015) highlight that it is not homelessness alone that leads to poorer outcomes, rather, increased exposure to multiple co-occurring risks that lead to poorer outcomes, with homeless students experiencing additional risk factors above and beyond those experienced by students in poverty.

### **Associations between Homelessness and Academic Outcomes**

Extant literature links homelessness to poorer performance across a variety of academic outcomes (Buckner, 2008; Deck, 2017; Fantuzzo et al., 2012; Manfra, 2019; Uretsky & Stone, 2016), and from the continuum of risk perspective, homeless students experience unique academic risks above and beyond their stably housed, low-income peers. For example, meta-analyses examining the effects of homelessness from 1987 to 2005 (Buckner, 2008) and 1990 to 2011 (Miller, 2011) indicate that homeless students are more likely to experience higher rates of absenteeism, lower standardized test scores and grades, higher levels of grade retention, increased between-school mobility, and higher rates of school dropout, when compared to their low-income, stably housed peers (Buckner, 2008; Miller, 2011). Additionally, homeless students have higher rates of disability identification (Miller, 2011). The residential instability experienced by homeless students can greatly disrupt students' academic trajectories via unfinished courses, unearned credits, mismatched curriculum across schools, and lost social

relationships (Balfanz et al., 2007; Cutuli et al., 2013; Metzger et al., 2015; Miller, 2011), thus increasing their odds of dropping out of high school (Metzger et al., 2015; Morton et al., 2018). For example, the 2021 Maryland State Report Card showed that the graduation rate for homeless students was 65%, compared to 79% and 87% for economically disadvantaged and advantaged students, respectively (Maryland State Department of Education, 2021). Despite these findings, some research presents a counternarrative, suggesting there are no significant differences in academic achievement between homeless students and their low-income, stably housed peers (Buckner et al., 2001, Deck, 2017; Fantuzzo et al., 2012). It is possible that these differences may be attributed to the small comparison groups (Deck, 2017) or conceptualizing homelessness as solely parental shelter stays (Buckner et al., 2001; Fantuzzo et al., 2012) as opposed to using the expanded federal definition of homelessness (Low et al., 2017). Furthermore, other studies vary in the operationalization of homelessness which include convenience samples, self-report measures, or the use of district-wide administrative data, which have yielded mixed findings (Buckner, 2008; Edidin et al., 2012; Miller, 2011; Morton et al., 2018).

The negative academic outcomes associated with prior experiences of homelessness may persist well into adulthood. Early academic difficulty may cascade to subsequent academic problems, including lower levels of planning for and enrolling in college (Havlik et al., 2018; Kull et al., 2019; Rafferty et al., 2004). However, to date, most of the research on homelessness focuses on the academic outcomes of students in primary school as opposed to students in secondary school (Brumley et al., 2015; Buckner, 2008; Fantuzzo et al., 2012; Miller, 2011), subsequently limiting knowledge about the transition into young adulthood, including transitions into postsecondary education.

### **Associations between Homelessness and Early Labor Market Outcomes**

The associations between homelessness and early labor market outcomes parallel those observed in academic domains, as homeless youth report high rates of unemployment (Ferguson et al., 2012; Slesnick et al., 2018). Instead, homeless youth are more likely to generate income from survival behaviors, such as panhandling (Ferguson et al., 2012). In 2018, approximately 17% of homeless youth in Maryland reported no income source (Miller et al., 2019). Common barriers to employment among homeless young adults include experiencing longer durations of homelessness, earning income from informal sources (e.g., panhandling), and/or struggling with drug addiction (Ferguson et al., 2012). Previous research confirms that stable housing is linked to formal employment in homeless young adults (Ferguson et al., 2012, 2014; Slesnick et al., 2018). Even when employed, homeless individuals earn significantly less than those without homeless experiences, and they often occupy unskilled, low-paying jobs (von Wachter et al., 2020). From the continuum of risk perspective, specific risks associated with homelessness, including residential instability and stigma, may contribute to worse employment outcomes for homeless youth and young adults (Ferguson et al., 2014; Slesnick et al., 2018).

### **Race, Ethnicity, Poverty, and Homelessness**

Experiences of poverty and homelessness among youth in the U.S. are notably higher for Black, Native American, and Latinx children, with an estimated one in three living in poverty, and roughly three-quarters comprising the homeless youth population (Carrasco, 2019; Koball & Jiang, 2018). Prior research in Maryland indicated that, on average, Black and Hispanic secondary school students were eligible for free/reduced price meals for about 57% of their enrollments between 6th and 12th grades, compared to a duration of about 17% for White students (Henneberger et al., 2022). Similarly, studies among homeless youth reveal stark racial differences, with youth of color being more likely to experience homelessness (Carrasco, 2019).

A recent study examining statewide administrative data in Michigan found that the probability of experiencing homelessness was three times higher among Black students and twice as high for Latinx students compared to White students (Evangelist & Shaefer, 2020). For many youth of color, the stresses of homelessness are further compounded by experiences of racism and discrimination (Carrasco, 2019; Wagmiller & Adelman, 2009). For example, historical and systemic biases and discrimination have led youth of color to have increased likelihoods of residing in segregated neighborhoods with marked levels of poverty and attending high-poverty schools with fewer resources, more inexperienced teachers, and higher rates of racial/ethnic minority students (Borman & Dowling, 2010; Chetty et al., 2016; Edwards, 2020; Kull et al., 2019; Reardon, 2016). Furthermore, racism and discrimination are interwoven into the labor market, adversely affecting upward social mobility by limiting employment opportunities, especially for Black students (Hardaway & McLoyd, 2009; Wilson & Rodgers, 2016).

### **The Current Study**

The purpose of the current study was to examine the link between homelessness in secondary school and subsequent important young adult outcomes, including postsecondary and early labor market outcomes. This is done within the framework of the *continuum of risk* (Masten et al., 1993), recognizing the importance of examining homelessness within the context of experiences with poverty (see Brumley et al., 2015). We use statewide longitudinal data from Maryland's public secondary schools (grades 6-12) to identify homeless students and students' eligibility for free/reduced price meals, which we use as an indicator of student disadvantage (Domina et al., 2018). We answer the following research question: *What is the association between adolescent homelessness, above and beyond the association with disadvantage, and students' odds of high school dropout, college enrollment, and early labor market earnings?*

From the continuum of risk framework, we hypothesize that adolescent students who experienced homelessness will have higher rates of dropout, lower rates of college enrollment, and worse early labor market outcomes than students who experienced disadvantage.

Additionally, students who experienced disadvantage will have worse outcomes than students who experienced neither disadvantage or homelessness.

## **Methods**

### **Data and Cohort**

This study used population-level linked longitudinal administrative data from the Maryland Longitudinal Data System (MLDS), which receives state-reported administrative data from multiple state agencies. The MLDS links State PreK-12 administrative records with postsecondary and workforce administrative records to support decision makers regarding students' education experience and career achievement. Longitudinal data records are obtained from three state agencies; PreK-12 student and school data are obtained from the Maryland State Department of Education (MSDE). Maryland public and state-aided independent college student and college data are obtained from the Maryland Higher Education Commission (MHEC). Data for out-of-state college enrollments and degrees are obtained by MSDE through the National Student Clearinghouse. Workforce data are obtained from the Maryland Department of Labor for individuals with an education record in the State of Maryland. The Labor data originate from Maryland's Unemployment Insurance (UI) collection, which includes individuals who work for employers who are subject to Maryland's Unemployment Insurance (UI) law. The UI data do not include federal employees, military employees, individuals who are self-employed, and private contractors.

Administrative data in the MLDS are linked across sources (i.e., state agencies), across years, and across data files within a state agency. MLDS Center staff use the state assigned student ID (SASID), which is a unique student identifier used by MSDE, the social security number, date of birth, first name, last name, and a demographic string to link records. Data from the motor vehicle administration are used to supplement identity linkage information. When new data are received, the first step is to determine whether a matching identity exists in the MLDS or whether a new identity must be created. A combination of deterministic and probabilistic record linkage (Han & Lahiri, 2019; Scheuren & Winkler, 1993) is used depending on the source information available for each record. A new identity with a new MLDS Person ID is created if the record does not match a current identity in the system. If the record matches a current identity in the system, the MLDS Person ID is assigned, and the record is linked. State agency staff deidentify the data and provide the deidentified data to researchers on a secured virtual server.

The cohort of students who were in 6<sup>th</sup> grade in the 2007-2008 academic year (the first year of MLDS data;  $N=63,282$ ) was used for the current study (also see Henneberger et al., 2022). This provided a reliable measure of student homelessness (across students' entire middle and high school years) as well as a full year of postsecondary and workforce data post-high school (for those who graduated on time in 2013-2014). Students ( $n=10,672$ ) were excluded from the final sample for the following reasons: (1) transferring out of the Maryland public school system ( $n=7,811$ ); (2) never enrolled in any Maryland public school at any time during 9<sup>th</sup> through 12<sup>th</sup> grade despite not being recorded as transfers out of Maryland public schools ( $n=955$ ); (3) missing values in race/ethnicity ( $n=414$ ) or 6<sup>th</sup> grade academic performance data ( $n=1,492$ ). Thus, the final analytic sample consisted of 52,610 students. Attrition analyses (Table 1) showed that excluded students were more likely to have experienced disadvantage, were less

likely to be White, and had lower Grade 6 Reading and Math scores. Most of the excluded students transferred out of Maryland Public Schools and we were therefore unable to track their outcomes. Among the limited sample of excluded students whose outcomes were able to be tracked, they were more likely to drop out and less likely to enroll in postsecondary.

[INSERT TABLE 1 HERE]

The cohort of 6th graders attended 454 schools in 2007-2008 from all 24 of Maryland's local school systems. School types included elementary, middle, combined, special education, alternative, and charter schools. Mean grade 6 enrollment was 136 and mean school enrollment was 554. On average schools were less than 1% American Indian, 4% Asian, 10% Hispanic, 51% Black/African-American, and 35% White; the mean percentage eligible for free or reduced-price meals was 47%.

### **Measures**

**Homelessness and disadvantage.** Student homelessness was identified in school records in accordance with the McKinney-Vento Homeless Assistance Act [42 U.S.C. 11431 et seq.; MK-V]). MK-V was enacted to ensure the identification of homeless students and reduce educational barriers for enrollment (e.g., waiving required documents) and attendance (e.g., transportation needs), in addition to targeting mainstreaming efforts by maintaining access at students' school of origin, despite their residential status (Pavlakis et al., 2017; Stone & Uretsky, 2016). Student disadvantage was identified in school records by examining eligibility for free or reduced-price meals (FRPM) using data from the National School Lunch Program (U.S. Department of Agriculture [USDA], 2017). Students living in households with incomes at or

below 130% of the federal poverty level were eligible for free meals, while students living in households with incomes between 130% and 185% of the federal poverty level were eligible for reduced-priced meals (USDA, 2017).

Measures of homelessness in school-based administrative data in any given year tend to undercount the true student homeless population (Miller, 2011; Morton et al., 2018). Because school systems generally rely on a mixture of point-of-contact identification during the enrollment process and self-report to identify students experiencing homelessness, the population of students identified as homeless may not reflect the full population of students actually experiencing homelessness (Cumming & Gloeckner, 2012). In Maryland public schools, the percentage of students in a grade who are identified as homeless each year ranges from 1.24% to 1.49% over the middle to high school time period for the period of this study (2008-09 through 2013-14). However, taking students' entire middle and high school histories into account, two percent of students in the cohort were ever homeless in the middle school grades and 3% of students in the cohort were ever homeless in the high school grades. On average, students in the cohort who did experience homelessness at some point ( $n=2,065$ ) spent 16% ( $SD = 0.23$ ) of their school enrollments identified as homeless in middle school and 30% ( $SD = 0.26$ ) of their school enrollments identified as homeless in high school. Similar to the measurement issues with homelessness, FRPM data has also been shown to have problems with reliability and validity, especially when assessing disadvantage for high school students, who tend to under-report FRPM eligibility (Domina et al., 2018; Michelmore & Dynarski, 2017). Prior research using the current sample showed that, on average, students were eligible for FRPM in about 35% of their school enrollments between 6th and 12th grades (see Henneberger et al., 2022).

To help mitigate the measurement challenges associated with homelessness and eligibility for FRPM, a categorical variable was created to determine students' experiences with homelessness and disadvantage over the full span of 6th through 12th grades. This variable consisted of three mutually exclusive categories: experienced homelessness, never experienced homelessness but experienced disadvantage (either eligible for free or reduced price meals), and never experienced homelessness or disadvantage. Although our primary interest is in the differences in outcomes between students who experienced disadvantage and students who experienced homelessness, we include the group of students who experienced neither<sup>1</sup> so that we can understand the full continuum of risk for the population of Maryland public school students (see Figure 1 below).

[INSERT FIGURE 1 HERE]

**Student race/ethnicity.** Student race and ethnicity was recoded into dummy variables for non-Hispanic White, non-Hispanic Black/African American, and Other (including Hispanic of any race, American Indian, Asian, Pacific Islander, two or more races).

**Student baseline academic performance.** Students' achievement in reading and math at baseline (6<sup>th</sup> grade) was measured using their scale scores on the 2008 Maryland School Assessments (MSA) in Reading and Math (MSDE, 2008). The MSA tests, part of Maryland's accountability system under No Child Left Behind, were developed by MSDE and Pearson with the involvement of a National Psychometric Council as well as committees that reviewed for content, bias, and vision accessibility. The tests were aligned to the Maryland reading and math standards set forth in the Voluntary State Curriculum and were administered statewide in April

2008. Possible scores ranged from 240 to 650 for the MSA Reading and Math. Students who had scores above 391 for Reading and above 407 for Math were deemed proficient by State standards (MSDE, 2008).

**School-level variables.** School-level composition characteristics included school percent ever homeless, school percent never homeless or disadvantaged, school percent non-Hispanic Black, school percent Other race/ethnicity, and school mean score on the 6<sup>th</sup> grade reading and math MSA. School-level variables were calculated by first creating a school-by-year measure calculating the percentage for each school for each school year, for all schools in the state across all years of the study. Each cohort member's overall school context was then assessed by taking the mean percentage measure across all schools attended over the course of their enrollment in grades 6 through 12. The homelessness, disadvantage, and racial/ethnic composition variables were rescaled by multiplying by 10. Due to high collinearity between school mean reading scores and school mean math scores, the two mean scores for each school were averaged to obtain a single measure of school baseline academic performance.

**High school dropout.** Students' high school completion status was measured by examining students' final enrollment records and exit codes prior to the end of academic year 2016-2017. Students whose final exit code indicated graduation were considered completers (non-dropouts). Students who were still enrolled were considered persisters (non-dropouts). Students whose final exit code indicated formal withdrawal from school, as well as students whose last enrollment record did not indicate graduation, formal withdrawal or transfer out of Maryland public schools but for whom no subsequent enrollment record was found, were considered dropouts.

**College enrollment.** Enrollment records in Maryland and out-of-state public and private 2-year and 4-year colleges were used to indicate college enrollment among those who graduated from high school on time (i.e., by the end of the 2013-2014 academic year). Students with any record of postsecondary enrollment including non-degree programs were considered as enrolled.

**Labor market earnings.** The sum of positive Maryland quarterly earnings in the first four quarters after high school graduation was calculated for each student who graduated from high school on time. Students with no earnings in any of the first four quarters after graduation were not included in the labor market earnings analyses. The earnings variable was log-transformed due to high skewness.

### **Analytic Strategy**

We use a similar analytic strategy to that outlined in Henneberger and colleagues (2022). Multiple membership multilevel modeling was used to examine the link between homelessness and subsequent academic and labor market outcomes, while also accounting for the fact that most students attended more than one school over the study time frame (6<sup>th</sup> through 12<sup>th</sup> grades). Traditional multilevel models assume that each lower-level unit or individual (e.g., student) is nested within only one higher-level cluster (e.g., school; Raudenbush & Bryk, 2002). In the present study, most students (63%) belonged to two schools (usually one middle school and one high school) over the course of their educational history from 6<sup>th</sup> grade through leaving high school, 22% of students attended three schools, and 3% attended 6 or more. Less than one percent of the analytic sample attended one school for the entire period. A multiple membership approach (Beretvas, 2011) with equal weighting (see Wolff Smith & Beretvas, 2014) was used to account for the relative influence of all schools attended by students over the period of the study.

A sequential modeling approach was used where, first, each outcome of interest was modeled with an unconditional model (Model 1). The outcome for student  $i$  who attended the set of schools  $\{j\}$  was modeled at level 1 as the average outcome for all students who attended the set of schools  $\{j\}$  plus the error term for student  $i$ . The average outcome for all students who attended the set of schools  $\{j\}$  was modeled at level 2 as the average outcome across all schools plus the sum of the weighted error terms for each school  $h$  that was a member of the set of schools  $\{j\}$ . We weighted each school equally such that the weights summed to 1. For example, if a student attended 2 schools, each was weighted 0.5.

Unconditional model for normally distributed outcomes:

Level 1 (students):

$$Y_{i\{j\}} = \beta_{0\{j\}} + e_{i\{j\}}$$

Level 2 (schools):

$$\beta_{0\{j\}} = \gamma_{00} + \sum_{h \in \{j\}} w_{ih} u_{0h}$$

In model 2, dummy variables for *ever experienced homelessness* and *never experienced homelessness or disadvantage* were added at the student level. The omitted category, never experienced homelessness but ever experienced disadvantage, was used as the reference category. In model 3, student race/ethnicity (White was the omitted reference category) and student's grade 6 MSA Reading and Math scores were added at the student level. In model 4, the school-level variables were added. All level 1 variables were group-mean centered, and all level 2 variables were grand-mean centered (Bell et al., 2018; Enders & Tofighi, 2007). The full model was a random intercept model. For model parsimony all level-1 variables were constrained as fixed at level 2 (preliminary analyses indicated very small, though statistically

significant, level-2 variation in student disadvantage slopes for some outcomes). Here, we present the results for the final models.

Full model:

Level 1 (students):

$$Y_{i\{j\}} = \beta_{0\{j\}} + \beta_{1\{j\}}\text{NeverDisadv}_{i\{j\}} + \beta_{2\{j\}}\text{Homeless}_{i\{j\}} + \beta_{3\{j\}}\text{Black}_{i\{j\}} + \beta_{4\{j\}}\text{Other}_{i\{j\}} + \beta_{5\{j\}}\text{MSAR}_{i\{j\}} + \beta_{6\{j\}}\text{MSAM}_{i\{j\}} + e_{i\{j\}}$$

Level 2 (Schools):

$$\beta_{0\{j\}} = \gamma_{00} + \sum_{h \in \{j\}} [w_{ih}(\gamma_{01}\text{PctNeverDisadv}_h + \gamma_{02}\text{PctHomeless}_h + \gamma_{03}\text{PctBlack}_h + \gamma_{04}\text{PctOther}_h + \gamma_{05}\text{MeanMSA}_h + u_{0h})]$$

$$\beta_{1\{j\}} = \gamma_{10}$$

$$\beta_{2\{j\}} = \gamma_{20}$$

$$\beta_{3\{j\}} = \gamma_{30}$$

$$\beta_{4\{j\}} = \gamma_{40}$$

$$\beta_{5\{j\}} = \gamma_{50}$$

$$\beta_{6\{j\}} = \gamma_{60}$$

Our coefficient of interest,  $\gamma_{20}$ , quantifies the size of the association between homelessness and the outcome variable compared to the size of the association between experiencing disadvantage without homelessness and the outcome variable. Binary outcomes, such as graduating from high school or enrolling in postsecondary education, were modeled in a similar fashion but using logistic models. All models were fitted using Markov Chain Monte Carlo (MCMC) procedures in MLwiN version 3.02 (Charlton et al., 2017; Browne, 2017) from Stata/SE version 15 using runmlwin (Leckie & Charlton, 2013). Informative priors were used based on single membership models. Defaults were used for the burn-in period (500 iterations) and the monitoring chain period (5,000 iterations). Models for Maryland workforce participation

and earnings were conducted separately for students who enrolled in postsecondary in Maryland colleges and students who did not enroll in postsecondary.

## Results

### Descriptive statistics

Descriptive statistics for all study variables are displayed in Table 2. Students who experienced homelessness at any point between 6<sup>th</sup> and 12<sup>th</sup> grade constituted about 4% of our cohort ( $n=2,065$ ). About 44% of our cohort were students who experienced disadvantage without ever being identified as experiencing homelessness by their school system. Fifty-two percent of students never experienced disadvantage or homelessness. Thirty-five percent of students were non-Hispanic Black, 46% were non-Hispanic White, and 19% of students were Other-race or Hispanic. On average, 9% of students dropped out of high school and 73% of students enrolled in college within one year of on-time high school graduation.

[INSERT TABLE 2 HERE]

Table 2 also shows descriptive statistics by disadvantage and homelessness. Non-Hispanic Black students were disproportionately represented among disadvantaged and homeless students. They comprised 18% of the never FRPM or homeless group, 53% of the ever FRPM but never homeless group, and 65% of the ever homeless group. Standardized test scores were lowest among homeless students: the mean MSA Reading Grade 6 score was 394 for homeless students, compared to 400 for disadvantaged students and 427 for never-disadvantaged students; disparities were similar for MSA Math. Descriptively, more homeless students dropped out (29%) compared to disadvantaged (16%) and never-disadvantaged students (3%). A lower percentage of homeless students (48%) enrolled in college compared to disadvantaged (59%) and

never-disadvantaged students (83%). Among on-time high school graduates not enrolling in college, earnings in the first year after high school were lowest for homeless students (\$6,857) compared to disadvantaged (\$7,633) and never-disadvantaged students (\$9,256). Conversely, among on-time high school graduates who did enroll in a Maryland college, homeless and disadvantaged students had higher average earnings in the first year after high school (\$5,852 and \$5,965, respectively) compared to never-disadvantaged students (\$4,882). School context variables also indicate descriptive differences across the three groups: never disadvantaged students attended schools where, on average, 70% of students were never disadvantaged, while homeless students attended schools where, on average, 43% of students were never disadvantaged. Homeless and disadvantaged students also attended schools with higher percentages of non-Hispanic Black students (51% and 49%, respectively) compared to never-disadvantaged students (24%).

### **Multilevel modeling results**

Intra-class correlation coefficients (ICCs) were estimated using the approach from Raudenbush & Bryk (2002). The estimated ICCs from the unconditional models for each outcome indicate substantial level-2 variation for academic outcomes. For binary outcomes, the dependent variable is assumed to follow a logistic distribution and the level-1 variance is assumed at  $\pi^2/3$  or approximately 3.29 (Hedeker, 2003; Hox et al., 2017). For dropout, the level-2 variance estimate is 6.29; assuming a level-1 variance of  $\pi^2/3$  this represents an intraclass correlation of 0.656, indicating that approximately 66% of the variation in dropout is due to differences between the schools that students attended between 6<sup>th</sup> and 12<sup>th</sup> grades. For college enrollment, the ICC was 0.384, indicating that 38% of the variance in college enrollment was due to differences between the schools that students attended between 6<sup>th</sup> and 12<sup>th</sup> grades. ICCs

for log earnings within the first year after on-time high school graduation are smaller. For non-college enrollees the ICC is 0.082 indicating that only 8% of the variation in earnings is due to differences between the schools that students attended between 6<sup>th</sup> and 12<sup>th</sup> grades. For individuals who were enrolled in Maryland colleges during the first year after on-time high school graduation, the ICC is similar (0.085).

Table 3 displays the results of the multilevel regression models predicting high school dropout, college enrollment, earnings for non-college students, and earnings for college students. The models include race/ethnicity and baseline academic achievement as covariates at the student level and the corresponding composite characteristics as covariates at the school level. For the first model, the intercept is interpreted as the average likelihood of dropout for average-performing white students experiencing disadvantage without homelessness attending the average school. This is estimated as 6%. Students who never experienced disadvantage or homelessness were less likely to drop out compared to that omitted referent group. The group most of interest for this study, students who experienced homelessness, were more than twice as likely to drop out compared to their disadvantaged peers ( $e^{0.74}=2.10$ ).

[INSERT TABLE 3 HERE]

In the second model, predicting college enrollment, results show that the average student experiencing disadvantage without homelessness has a 76% probability of enrolling in college within the first year after on-time high school graduation ( $(e^{1.14})/(1+e^{1.14})=0.758$ ) while the average student who experienced neither disadvantage or homelessness has an 87% probability

( $e^{(1.14+0.73)}/(1+e^{(1.14+0.73)})=0.866$ ) and the average student who experienced homelessness has a 69% probability ( $e^{(1.14+0.35)}/(1+e^{(1.14+0.35)})=0.688$ ).

The third model predicts total log earnings in the first year after on-time high school graduation for students not enrolled in college. Predicted earnings for students who experienced homelessness were not significantly different from those of students who experienced disadvantage ( $B = -0.05, p > .05$ ). Examining the results from the third model for students who never experienced disadvantage indicate that they are predicted to have earnings about 8% higher ( $e^{.08}=1.08$ ) than those who experienced disadvantage without homelessness.

The fourth model predicts total log earnings in the first year after on-time high school graduation for students enrolled in a Maryland college. Again, predicted earnings for students who experienced homelessness were not significantly different from those of students who experienced disadvantage ( $B = -0.03, p > .05$ ). Students who never experienced disadvantage have predicted earnings about 20% lower ( $e^{-.22}=0.80$ ) than those who experienced disadvantage without homelessness.

### **Post hoc analyses for labor market outcomes**

Post hoc analyses were conducted to further examine the continuum of risk in relation to labor market earnings. Based on findings from previous literature (Ferguson et al., 2014; Slesnick et al., 2018), we hypothesized homeless students to have worse labor market outcomes than students who experienced disadvantage alone. However, we know that homelessness and disadvantage are deeply and structurally tied to race/ethnicity in the United States (i.e., White students may experience homelessness and disadvantage differently from students of color; Carrasco, 2019; Evangelist & Shaefer, 2020; Wagmiller & Adelman, 2009). As such, we conducted post hoc analyses to examine the relationship of our key constructs of interest with

labor market outcomes within race/ethnicity to determine whether the continuum of risk was supported for sub-populations of Black, White, and Other-race/ethnicity students when examining labor market outcomes.

Table 4 presents full model results for the individuals who were not enrolled in college. The pattern identified previously (see Table 3) where those who never experienced disadvantage/homelessness earned significantly more than those who experienced disadvantage holds only for non-Hispanic Whites. Additionally, for non-Hispanic Whites, students who experienced homelessness earned 21% less ( $e^{-0.24}=0.79$ ) than those who experienced disadvantage alone ( $B = -0.24, p < .05$ ). Among Black non-college enrollees, there were no significant differences based on disadvantage experiences.

[INSERT TABLE 4 HERE]

Table 5 presents full model results for the individuals who were enrolled in a Maryland college. The previously identified pattern (see Table 3), where those who never experienced disadvantage earned significantly less while enrolled in college, held true only for the Other and White racial/ethnic groups.

[INSERT TABLE 5 HERE]

## Discussion

The current study leveraged statewide administrative data to investigate the associations between adolescent homelessness and long-term academic and early labor market outcomes, above and beyond the associations between student disadvantage and outcomes. The National Center for Homeless Education highlights adolescents as one of the fastest growing segments of the homeless population (NCHE, 2020). Homelessness during adolescence may be particularly challenging because residential disruptions during this developmental time period would coincide with the normative challenges faced during adolescence, such as a focus on identity formation and developing peer relationships (Lerner & Steinberg, 2009). Using the “continuum of risk” framework as a lens (Masten et al., 1993), our study extends the findings of Brumley and colleagues (2015) to provide additional evidence for homelessness conferring risk to students’ educational success (e.g., high school persistence and postsecondary enrollment), above and beyond that conferred by disadvantage alone. In general, homeless students experienced worse academic outcomes, including higher predicted likelihoods of high school dropout and lower predicted likelihoods of college enrollment, than their stably housed, disadvantaged peers but did not experience worse early labor market outcomes. However, post hoc analyses indicated initial support for the continuum of risk in relation to labor market outcomes for White students not attending college.

### Homelessness and Educational Outcomes

Consistent with the continuum of risk framework (Brumley et al., 2015; Masten et al., 1993) and prior studies on early homelessness experiences (Gubbels et al., 2019; Kennelly & Monrad, 2007; Rumberger, 2020), we found that homeless students were twice as likely to drop out of high school and were 31% less likely to enroll in college, compared to their disadvantaged

peers. Prior research indicates that homeless students experience unique risks, including encountering more disruptions in their educational experiences due to frequent residential changes (Metzger et al., 2015). Additionally, homeless students are more likely to struggle with academic problems, such as absenteeism, underperformance, and grade retention, which are associated with future high school dropout (Gubbels et al., 2019; Kennelly & Monrad, 2007; Rumberger, 2020). Early academic difficulty likely cascades to subsequent academic problems, including lower levels of planning for and enrolling in college (Havlik et al., 2018; Kull et al., 2019; Rafferty et al., 2004). As an additional risk, above and beyond that experienced by disadvantaged students, it is possible that homeless students are preoccupied with their immediate survival and safety needs (Maslow, 1943), reducing the ability to provide attention to longer-term educational goals, such as attending college, making those goals seemingly unattainable (Havlik et al., 2018). Additionally, homeless youth are more likely to be first-generation college students, so unfamiliarity with the college selection process (e.g., college entrance exams, application deadlines, and financial aid) and/or lack of support in navigating the college environment may also limit their access to college enrollment opportunities (Havlik et al., 2018; Tierney et al., 2008).

### **Homelessness and Early Labor Market Outcomes**

**Students not enrolled in college.** On average, for students who were not enrolled in college, there was no significant difference between predicted earnings for students who were homeless and students who experienced disadvantage without homelessness. This finding is not consistent with the continuum of risk framework for labor market outcomes. Post hoc analyses revealed a significant negative relationship between homelessness and early labor market earnings for the White sub-population of students, suggesting that the cumulative risks

associated with homelessness translate to lower annual workforce earnings for White students experiencing homelessness compared to White students experiencing disadvantage while stably housed. This finding supports the continuum of risk framework for labor market outcomes within the subgroup of White students. The continuum of risk framework for labor market outcomes was not supported for Black and Other-race students, who earned similar wages, whether they experienced disadvantage, homelessness, or neither. It may be that once homeless and disadvantaged students of color reach a certain threshold of risk, differences in early labor market outcomes disappear due to the structural and discriminatory experiences of minority individuals in the United States (Quillian et al., 2017), which may account for more of the variance in labor market outcomes than housing status alone.

**Students enrolled in college.** Results predicting annual workforce earnings for students who were enrolled in college revealed no significant differences between homeless students and their disadvantaged peers, which mirrors the results for students who were not enrolled in college. Students who were never disadvantaged or homeless had lower earnings than students who were disadvantaged, which may reflect a need for low-income students to work longer hours or occupy multiple jobs to cover college-related expenses, such as tuition and housing (Long & Riley, 2007; Pike et al., 2008). Furthermore, students who are disadvantaged may have long-term debt associated with pursuing higher education (Cahalan et al., 2022). For example, there remains a disparity between college costs and Pell grant awards, which are based upon financial need to help mitigate college-related costs for low-income students. Over the last 50 years, college costs have increased by 157% compared to Pell Grant awards, which have only increased by 27% (Cahalan et al, 2022). Our findings suggest that earnings may not be a good

indicator of financial stability, but instead may indicate student need for financial assistance while in college.

### **Limitations**

The findings of this study should be interpreted within the context of the following limitations. First, our study is correlational; therefore, causal inferences about disadvantage and homelessness cannot be made from the results of this study. Second, our study used school-based administrative data to identify homelessness, while other studies have used data from a Homelessness Management Information System (HMIS; Brumley et al., 2015). Future research would benefit from replication using multiple data sources, including interviews and self-report, to identify the homeless population (Cumming & Gloeckner, 2012). Third, our estimates of the associations between homelessness, disadvantage, and outcomes may be confounded by overlapping risk factors, not measured here, that students experiencing homelessness or disadvantage may also experience. For example, homeless students may also be involved in child welfare (Park et al., 2004) or juvenile justice systems (McCarthy & Hagan, 1992). Fourth, our study did not examine variation in effects across schools or districts, and it is possible that homelessness has a larger or smaller association with outcomes in certain schools or districts.

Our examination of workforce outcomes relied on the Maryland unemployment insurance data, which does not include individuals who work in specific sectors, including private contracting, federal employment, military employment, self-employment, out-of-state employment, and informal employment. Homeless young adults often earn income through informal sources, such as panhandling, for survival (Ferguson et al., 2012; Slesnick et al., 2018). In 2018, approximately 12% of homeless youth in Maryland reported panhandling as a source of income, 13% sold drugs for income, and 6% engaged in sex work for income (Miller et al.,

2019). The analyses of early labor market earnings may be biased if students who experienced homelessness are more or less likely to work these types of jobs than students who did not experience homelessness but experienced disadvantage. Additionally, the results examining workforce outcomes were limited to students who graduated from high school and had nonzero earnings in the first four quarters after high school, limiting the generalizability of these results. Lastly, in our examination of early labor market outcomes, we did not account for high school work experiences. Those experiences could partially explain observed differences in post-high school earnings (Light, 1999; Painter II, 2010).

### **Implications for Policy and Programming**

Our study found that students who experienced homelessness had less favorable academic outcomes compared to their stably housed, disadvantaged peers. In terms of academic outcomes, our findings support the continuum of risk framework, where homeless students are at the extreme end of the continuum, experiencing risks above and beyond those experienced by their stably-housed disadvantaged peers, suggesting a need for targeted services. Currently, support for students identified by schools as experiencing homelessness is guided by federal policy, specifically The McKinney-Vento Homeless Assistance Act [42 U.S.C. 11431 et seq.; MK-V]). The MK-V act was enacted to help with the identification of homeless students and help to reduce barriers for academic enrollment, attendance, and achievement (see Pavlakis et al., 2017; Stone & Uretsky, 2016). Although this study does not explicitly examine the effectiveness of MK-V services, our findings that MK-V identified students (i.e., homeless students) have less favorable academic outcomes than disadvantaged students appear to support prior suggestions that MK-V services may be insufficient to mitigate the additional challenges posed by homeless experiences in secondary school (Hendricks & Barkley, 2012).

The current services provided to homeless students through MK-V may best be described as stabilization services, which include the right to stay in one's school of origin, transportation to and from school, and access to Title I services (e.g., free and reduced-price meals, after-school tutoring, etc.). These services are designed to maintain educational and relational stability—by keeping students in their school of origin—and prevent learning loss via Title I tutoring services. The findings from the current study highlight the need for additional academic support services tailored to the needs of homeless students. Helping students with complex needs graduate high school is not a simple task. Additional services may be provided off-site, such as libraries or shelters, to target and remediate specific academic needs. Additionally, on-site school-based services, such as wrap-around programming provided by school-site team members (e.g., social worker, counselor), have shown promise in preventing dropout among high-risk students (Fries et al., 2012). Other relational attendance focused interventions, such as Check and Connect, have also demonstrated effectiveness across settings with hard to serve populations (Christenson & Pohl, 2020). Additionally, stigma may be a major barrier to service provision, particularly among adolescents, who are establishing their sense of identity, a key feature of adolescence (Cumming & Gloeckner, 2012; Cutuli et al., 2020). However, the adoption of trauma informed marketing and outreach may be a useful tool in addressing the threat of stigma for homeless adolescents who need academic supports (Cutuli et al., 2020; Goldberg, 2020; Henriques et al., 2022). For example, districts can consider naming programs and giving staff titles that allow students and families to access their services without publicly broadcasting their housing status (see Oakland Unified School District, n.d.).

Overall, our findings suggest the need for a higher level of service and investment in programming to support the postsecondary outcomes of students experiencing homelessness. It

may be more beneficial to invest in dedicated staffing and supplemental targeted programming. Funding a full time MK-V liaison that can coordinate with schools, community programs, and shelters to create a network of helping adults may be the most basic missing element of most systems. Such adults can ensure that school site staff and students know about key secondary and postsecondary resources and help to identify the unique needs of homeless students transitioning to postsecondary settings.

### **Conclusion**

This study used statewide population-level linked administrative data from Maryland to examine the association between homelessness in secondary school and later academic and early labor market outcomes, above and beyond the association between disadvantage and outcomes. Consistent with Brumley and colleagues (2015), we found support for the continuum of risk framework (Masten et al., 1993; Masten et al., 2015) when examining academic outcomes: homelessness was associated with a higher likelihood of high school dropout and a lower likelihood of college enrollment, when compared to experiences with disadvantage, but not homelessness. Our results suggest that with regard to academic outcomes, homelessness confers additional risk above and beyond the risk associated with the experience of disadvantage alone. However, the continuum of risk framework was not supported when examining early labor market outcomes, but post hoc analyses indicated support for the continuum of risk for White students not attending college. These findings highlight the potential for unique experiences of the continuum of risk across demographic subgroups. Understanding the unique experiences of homeless students can help with targeting interventions and supports to improve academic and workforce outcomes in high school and into postsecondary.

### Notes

<sup>1</sup> We conducted a sensitivity analysis, running the same models including only students who had experienced disadvantage or homelessness. Results remained substantively the same.

**Data Availability Statement:** The data that support the findings of this study are available from the Maryland Longitudinal Data System (MLDS) Center. Restrictions apply to the availability of these data, which were used under contract for this study. Access to the restricted use data is available with permission from the MLDS Center.

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Table 1

## Comparison of Students Excluded and Included in Statistical Analysis

	Excluded (N=10,672)			Included (N=52,610)			t	df	p
	n	Mean	SD	n	Mean	SD			
<i>Student Variables</i>									
Never FRPM or homeless	10,672	0.50	0.50	52,610	0.52	0.50	-3.35	63280	0.0008
Ever FRPM but never homeless	10,672	0.46	0.50	52,610	0.44	0.50	3.51	63280	0.0004
Ever homeless	10,672	0.04	0.19	52,610	0.04	0.19	-0.36	63280	0.7196
Non-Hispanic Black	10,219	0.39	0.49	52,610	0.35	0.48	6.93	14290.2 <sup>b</sup>	0.0000
Other race/ethnicity	10,622	0.24	0.42	52,610	0.19	0.39	9.99	14531.5 <sup>b</sup>	0.0000
Non-Hispanic White	10,623	0.39	0.49	52,610	0.46	0.50	-12.72	15429.3 <sup>b</sup>	0.0000
Grade 6 Reading	7,888	411.55	37.82	52,610	413.80	36.93	-4.94	10272.6 <sup>b</sup>	0.0000
Grade 6 Math	8,205	421.20	40.66	52,610	427.31	39.67	-12.70	10783.7 <sup>b</sup>	0.0000
Dropped out	2,861	0.46	0.50	52,610	0.09	0.29	39.08	2968.13 <sup>b</sup>	0.0000
Postsecondary enrollment <sup>a</sup>	1,047	0.69	0.46	45,580	0.73	0.44	-2.95	46625	0.0032
First year earnings, non-college enrollees <sup>a</sup>	171	7895.76	7369.236	8,529	8160.56	9257.47	-0.46	180.92 <sup>b</sup>	0.6442
First year log earnings, non-college enrollees <sup>a</sup>	171	8.37	1.36	8,529	8.49	1.23	-1.27	8698	0.2052
First year earnings, MD college enrollees <sup>a</sup>	424	5439.44	5145.86	18,177	5285.95	5501.43	0.57	18599	0.5695
First year log earnings, MD college enrollees <sup>a</sup>	424	8.02	1.32	18,177	8.00	1.25	0.25	18599	0.8049
<i>School Variables</i>									
% Never FRPM or homeless	10,672	0.58	0.23	52,610	0.57	0.24	5.39	15765.9 <sup>b</sup>	0.0000
% Ever FRPM but never homeless	10,672	0.41	0.22	52,610	0.41	0.23	-1.95	15656.5 <sup>b</sup>	0.0512
% Ever homeless	10,672	0.01	0.02	52,610	0.02	0.02	-52.06	15898.8 <sup>b</sup>	0.0000
% Non-Hispanic Black	10,672	0.41	0.30	52,610	0.36	0.30	13.14	63280	0.0000
% Other	10,672	0.17	0.15	52,610	0.19	0.15	-8.24	63280	0.0000
% Non-Hispanic White	10,672	0.43	0.31	52,610	0.46	0.31	-10.58	63280	0.0000
Mean Reading & Math	8,205	426.28	16.92	52,610	426.51	17.90	-1.12	11266.1 <sup>b</sup>	0.2648

Notes. n = total number of students included in calculations for the mean and standard deviation. FRPM=eligibility for free/reduced-price meals. Disadvantage and homelessness were measured between 6th and 12th grades using statewide administrative data. a. Within 1 year of on-time high school graduation. b. Satterthwaite's degrees of freedom due to unequal variances.

Table 2

Descriptive statistics for study variables, overall and by student disadvantage and homelessness

	Student disadvantage and homelessness			
	All students ( <i>N</i> = 52,610)	Never FRPM or homeless ( <i>n</i> = 27,320)	Ever FRPM but never homeless ( <i>n</i> = 23,225)	Ever homeless ( <i>n</i> = 2,065)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
<b>Student Variables</b>				
Never FRPM or homeless	0.52 (0.50)	1.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Ever FRPM but never homeless	0.44 (0.50)	0.00 (0.00)	1.00 (0.00)	0.00 (0.00)
Ever homeless	0.04 (0.19)	0.00 (0.00)	0.00 (0.00)	1.00 (0.00)
Non-Hispanic Black	0.35 (0.48)	0.18 (0.38)	0.53 (0.50)	0.65 (0.48)
Other race/ethnicity	0.19 (0.39)	0.17 (0.38)	0.22 (0.42)	0.12 (0.32)
Non-Hispanic White	0.46 (0.50)	0.65 (0.48)	0.24 (0.43)	0.24 (0.43)
Grade 6 Reading	413.80 (36.93)	427.41 (35.43)	399.58 (32.64)	393.73 (32.23)
Grade 6 Math	427.31 (39.67)	442.70 (37.01)	411.33 (35.60)	403.50 (33.64)
Dropped out	0.09 (0.29)	0.03 (0.16)	0.16 (0.37)	0.29 (0.45)
Postsecondary enrollment <sup>a</sup>	0.73 <sup>b</sup> (0.44)	0.83 <sup>c</sup> (0.37)	0.59 <sup>d</sup> (0.49)	0.48 <sup>c</sup> (0.50)
First year earnings, non-college enrollees <sup>a</sup>	\$8,160.56 <sup>f</sup> (9,257.47)	\$9,255.96 <sup>g</sup> (11,810.42)	\$7,633.47 <sup>h</sup> (7,559.82)	\$6,857.39 <sup>i</sup> (6,189.43)
First year log earnings, non-college enrollees <sup>a</sup>	8.49 <sup>f</sup> (1.23)	8.61 <sup>g</sup> (1.22)	8.43 <sup>h</sup> (1.23)	8.33 <sup>i</sup> (1.22)
First year earnings, MD college enrollees <sup>a</sup>	\$5,285.95 <sup>j</sup> (5,501.43)	\$4,882.14 <sup>k</sup> (5,313.34)	\$5,964.65 <sup>l</sup> (5,683.43)	\$5,851.61 <sup>m</sup> (6,693.61)
First year log earnings, MD college enrollees <sup>a</sup>	8.00 <sup>j</sup> (1.25)	7.91 <sup>k</sup> (1.24)	8.16 <sup>l</sup> (1.26)	8.13 <sup>m</sup> (1.19)
<b>School Variables</b>				
% Never FRPM or homeless	0.57 (0.24)	0.70 (0.18)	0.43 (0.22)	0.43 (0.21)
% Ever FRPM but never homeless	0.41 (0.23)	0.29 (0.17)	0.54 (0.21)	0.54 (0.20)
% Ever homeless	0.02 (0.02)	0.02 (0.01)	0.03 (0.02)	0.04 (0.02)
% Non-Hispanic Black	0.36 (0.30)	0.24 (0.24)	0.49 (0.31)	0.51 (0.29)
% Other race/ethnicity	0.19 (0.15)	0.19 (0.13)	0.18 (0.17)	0.16 (0.12)
% Non-Hispanic White	0.46 (0.31)	0.58 (0.27)	0.33 (0.30)	0.34 (0.28)
Mean Reading & Math	420.02	427.17	412.34	411.83

(16.02) (12.76) (15.65) (14.96)

Notes. FRPM = eligibility for free/reduced price meals; Disadvantage and homelessness were measured between 6<sup>th</sup> and 12<sup>th</sup> grades using statewide administrative data. a. Within 1 year of on-time high school graduation. b.  $n=45,580$ . c.  $n=26,259$ . d.  $n=18,080$ . e.  $n=1,241$ . f.  $n=8,529$ . g.  $n=2,997$ . h.  $n=5,059$ . i.  $n=473$ . j.  $n=18,177$ . k.  $n=11,360$ . l.  $n=6,468$ . m.  $n=349$ .

Table 3

Results of the Multilevel Regression Models Predicting High School Dropout, College Enrollment, Earnings for Non-College Students, and Earnings for College Students

	High School Dropout ( $N = 52,610$ )		College Enrollment <sup>a</sup> ( $n = 45,580$ )		Earnings for Non-College Students <sup>a</sup> ( $n = 8,529$ )		Earnings for College Students <sup>a</sup> ( $n = 18,177$ )	
	B	SE	B	SE	B	SE	B	SE
Level-1 parameters								
Intercept	-2.89***	.14	1.14***	.03	8.50***	.02	8.03***	.01
Never FRPM or homeless	-1.24***	.05	.73***	.03	.08*	.03	-.22***	.02
Homeless	.74***	.06	-.35***	.06	-.05	.06	-.03	.07
Black, non-Hispanic	-.89***	.06	.65***	.04	-.27***	.04	-.34***	.03
Other race/ethnicity	-.60***	.06	.47***	.04	.02	.05	-.06*	.03
Grade 6 Reading	-.00**	.00	.01***	.00	-.00*	.00	-.00***	.00
Grade 6 Math	-.02***	.00	.01***	.00	.00*	.00	-.00***	.00
Level-2 parameters								
% Never FRPM or homeless	-.33***	.05	.25***	.02	-.01	.01	-.08***	.01
% Homeless	-7.03***	.34	-1.31***	.21	-.27*	.12	.07	.11
% Black	.16***	.04	.13***	.01	-.06***	.01	-.09***	.01
% Other race	-.36***	.07	.20***	.02	-.02	.01	-.08***	.01
Mean Reading & Math <sup>b</sup>	-.01***	.00	.02***	.00	-.00*	.00	-.01***	.00
Random parameters								
Level-2 variance	7.58***	.58	0.45***	.05	0.04*	.01	0.05***	.01
Level-1 variance					1.45***	.02	1.46***	.02
Model fit (DIC)	23,888.22		43,704.31		27,464.88		58,603.49	

Note. Level-1 (student) variables were group-mean centered; Level-2 (school) variables were grand-mean centered. FRPM=free or reduced-price meals. Disadvantage and homelessness were measured between 6<sup>th</sup> and 12<sup>th</sup> grades using statewide administrative data. DIC = Deviance information criterion. Referent is FRPM-only, white non-Hispanic, avg test scores in avg school.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . a. Within the first year of on-time high school graduation. b. Mean of grade 6 Reading and Math scores.

Table 4

Results of multilevel regression models predicting log earnings in the first year after on-time graduation from high school, non-college enrollees, by race/ethnicity

	Black ( <i>n</i> = 3,506)		Other ( <i>n</i> = 1,064)		White ( <i>n</i> = 3,959)	
	B	SE	B	SE	B	SE
Level-1 Fixed Effects						
Intercept	8.40***	.04	8.52***	.05	8.56***	.04
Never FRPM or homeless	.08	.06	-.11	.09	.14**	.04
Homeless	.04	.08	.06	.19	-.24*	.11
Grade 6 Reading	.00	.00	.00	.00	-.00**	.00
Grade 6 Math	.00*	.00	.00	.00	.00	.00
Level-2 Fixed Effects						
% Never FRPM or homeless	-.01	.02	-.02	.04	.03	.02
% Homeless	-.43**	.16	-.22	.37	.01	.20
% Black	-.03*	.01	-.03	.02	-.01	.02
% Other race	-.02	.02	.02	.03	-.12***	.03
Mean Grade 6 Reading & Math	.00	.00	.00	.00	-.01**	.00
Random parameters						
Level-2 variance	.01	.02	.02	.02	.05*	.02
Level-1 variance	1.48***	.04	1.36***	.06	1.45***	.03
Model fit (DIC)	11333.20		3362.87		12752.87	

Note. Level-1 (student) variables were group-mean centered; Level-2 (school) variables were grand-mean centered. FRPM=free or reduced-price meals. Disadvantage and homelessness were measured between 6<sup>th</sup> and 12<sup>th</sup> grades using statewide administrative data. DIC = Deviance information criterion. Referent is FRPM-only, white non-Hispanic, avg test scores in avg school.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 5

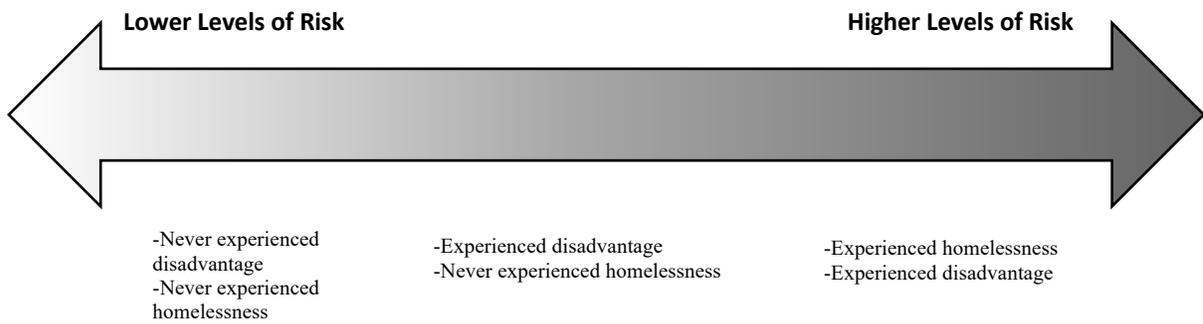
Results of multilevel regression models predicting log earnings in the first year after on-time graduation from high school, Maryland college enrollees, by race/ethnicity

	Black ( <i>n</i> = 5,313)		Other ( <i>n</i> = 3,536)		White ( <i>n</i> = 9,328)	
	B	SE	B	SE	B	SE
Level-1 Fixed Effects						
Intercept	7.93***	.03	8.09***	.03	8.24***	.03
Never FRPM or homeless	-.07	.04	-.31***	.05	-.26***	.03
Homeless	-.01	.09	-.01	.19	0.07	.13
Grade 6 Reading	.00	0	-.00***	0	-.00***	.00
Grade 6 Math	-.00*	0	.00	0	-.00***	.00
Level-2 Fixed Effects						
% Never FRPM or homeless	-.06***	.01	-.11***	.02	-.06***	.02
% Homeless	-.11	.15	-0.08	.25	0.23	.15
% Black	-.06***	.01	-.05**	.02	-0.02	.01
% Other race	-.10***	.02	-.06***	.02	-.13***	.02
Mean Grade 6 Reading & Math	.00	.00	-.01***	.00	-.01***	.00
Random parameters						
Level-2 variance	.016	.01	.031	.02	.04***	.01
Level-1 variance	1.58***	.03	1.59***	.04	1.33***	.02
Model fit (DIC)	17,525.85		11,719.80		29,238.10	

Note. Level-1 (student) variables were group-mean centered; Level-2 (school) variables were grand-mean centered. FRPM=free or reduced-price meals. Disadvantage and homelessness were measured between 6<sup>th</sup> and 12<sup>th</sup> grades using statewide administrative data. DIC = Deviance information criterion. Referent is FRPM-only, white non-Hispanic, avg test scores in avg school.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Figure 1. Measuring Homelessness and Disadvantage Using the Continuum of Risk Framework



*Note:* Disadvantage was measured using students' eligibility for free/reduced price meals (FRPM); Homelessness was measured through identification in school records in accordance with the McKinney-Vento Homeless Assistance Act (42 U.S.C. 11431 et seq.; MK-V). Disadvantage and homelessness were measured between 6<sup>th</sup> and 12<sup>th</sup> grades using statewide administrative data. We base our continuum of risk framework on the literature of Masten et al. (1993) and Brumley and colleagues (2015).